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A mutant form of the meadow viper (*Vipera ursinii rakosiensis* Méhely) from Hungary with a peculiar colour pattern

by
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Abstract: A gravid female of the meadow viper (*Vipera ursinii rakosiensis*) with a peculiar colour pattern is described from one of the last Hungarian localities of this rare and endangered snake. A detailed morphological characterization of the mutant specimen is given and illustrated, together with a short summary of its 95 days life history in the terrarium. Before releasing, the female has given birth to 19 youngs, 13 of them having the same mutant colouration.
Key words: meadow viper, *Vipera ursinii rakosiensis*, mutant colour pattern

Introduction

It is an unfortunate, though well-known fact, that the isolated populations of the meadow viper (*Vipera ursinii rakosiensis* Méhely, 1893) in the Carpathian Basin - and hence in Hungary - have become endangered during the last decades (Takács *et al.* 1987, Korsós 1992). This tendency was caused partly by the illegal collections of Hungarian and foreign pet-keepers, but more considerably the consequence of the changes of natural habitats, e. g. the draining and afforestation in the Hanság, the development of large agricultural fields, the fragmentation, overgrazing or break of meadows in the Great Hungarian Plain, the spring pasture burning, the use of fertilizers, and last but not least the increasing number of predators.

As a consequence of the profound changes in the ecological conditions of the localities, certain populations of the meadow viper have considerably reduced in number, or have even completely disappeared. Realizing the situation, the Hungarian Ministry for the Protection of the Environment enlisted the meadow viper as a highly protected species, having a theoretical nature conservation value of 500,000 Hungarian Forints.

During the preparation of the Kiskunság National Park established in 1975, the boundaries of the protected areas were also decided on the basis of the considerations mentioned above. Moreover, within the 13,000 hectares of the Hanság Nature Reserve, an important and pristine meadow viper habitat was fenced and put under strict protection as "The Sanctuary".

On the 26th of August, 1985, eight members of the Conservation Committee of the Societas Europaea Herpetologica, headed by Mr. Keith Corbett, visited the Sanctuary in the Hanság Nature Reserve. In spite of the inappropriate weather conditions, 12 specimens of *Vipera ursinii rakosiensis* have been observed and photographed, including a gravid female. The decision of the Committee was to come back after two years, and to help to organize a survey of the habitats and popul-

ations of the meadow viper in order to clarify the present situation and to evaluate the necessary conservation measures.

Five members of the Conservation Committee (incl. Chairman Keith Corbett) returned on the 25th of April, 1987. Between 26th April and 3rd May altogether 12 persons (incl. young and enthusiastic Hungarian herpetologists) participated in the survey. According to the program compiled by the Hungarian side, the well-known old habitats and possible new ones, the original biotopes and the ones destroyed were all surveyed: from Northeast of Budapest to the South to Tázlár in the Kiskunság National Park between the rivers Danube and Tisza. The Sanctuary has also been visited again, together with some other meadows in the Hanság.

Our survey was disturbed by the cold, windy weather in the beginning, later, however, the sudden and early warm period resulted in severe success, among others three new localities of *Ablepharus kitaibelii fitzingeri* Mertens were found.

Having investigated three big areas South of Budapest, 9 specimens of *V. u. rakosiensis* were found altogether. While one day we found 4 vipers in the Dabas-Gyón area, the next day the whole meadow was in fire following the every-spring activity of the shepards. Evidences were found of burnt lizards (*Lacerta agilis*), and a nest of the strictly protected curlew (*Numenius arquata*), other pairs of waders left the area before breeding. A dead *V. u. rakosiensis* specimen has also been found, probably killed by a raptor.

On the 2nd of May, 1987, under a sky covered with thin clouds, on a large meadow with the grass *Chrysopogon gryllus*, a female *Vipera ursinii rakosiensis* has been found with an extraordinary, peculiar colour pattern.

Description of the mutant meadow viper form

Total length: 560 mm; tail length: 55 mm. Weight: 116 gr.

Colouration slightly greenish grey. Dorsal scale keels are blackish, hence the animal's appearance is tabby. ("Hairy snake" is a widespread name on the Great Hungarian Plane for the normally coloured meadow viper.)

The most striking character is the missing dorsal band, which is in the normal specimens usually wide, grass-yellow, having a brown, black margined, zic-zac stripe in it. The greyish base colour in the specimen at hand turns into yellowish-grey at the hind third of body. Head length/head width ratio 14:10. Dorsal scutes on the head are arranged in complete agreement with the normal meadow vipers. The only asymmetric feature is the presence of three small scales separating the right scutum supraoculare from the scutum frontale, whereas on the left side only one elongated scutellum is present. This character can clearly be observed also on the fresh shedding. Eye is shiny, bronze brown, pupil is a vertical slit.

Head is dorsally provided with a dark grey, Y-shaped mark on a pale greyish background. A similar sign can often be seen on the specimens of *Vipera berus*. Normal *V. u. rakosiensis* specimens show usually an H-shaped mark. The specimen at hand lacks also a black stripe connecting the eye with the ear region, which is characteristic for the normally coloured meadow vipers.

Behind the branches of the "Y" mark in the occipital region a series of small, black, double spots - like equation marks - are situated on the dorsal side of the neck, however, the short lines are slipped along each other from the fifth, becoming larger on the dorsal side until the hind third of the specimen. In general

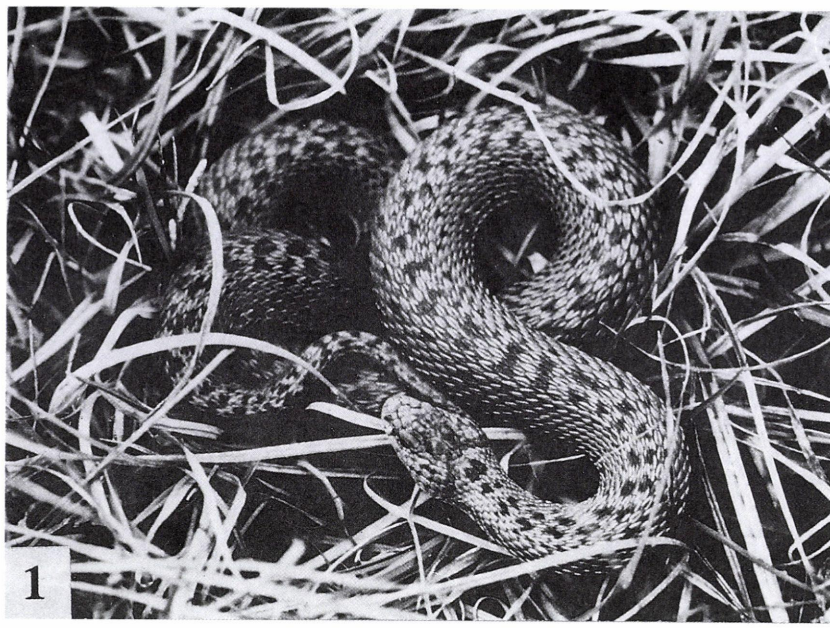

Fig. 1. The mutant meadow viper form in the original habitat

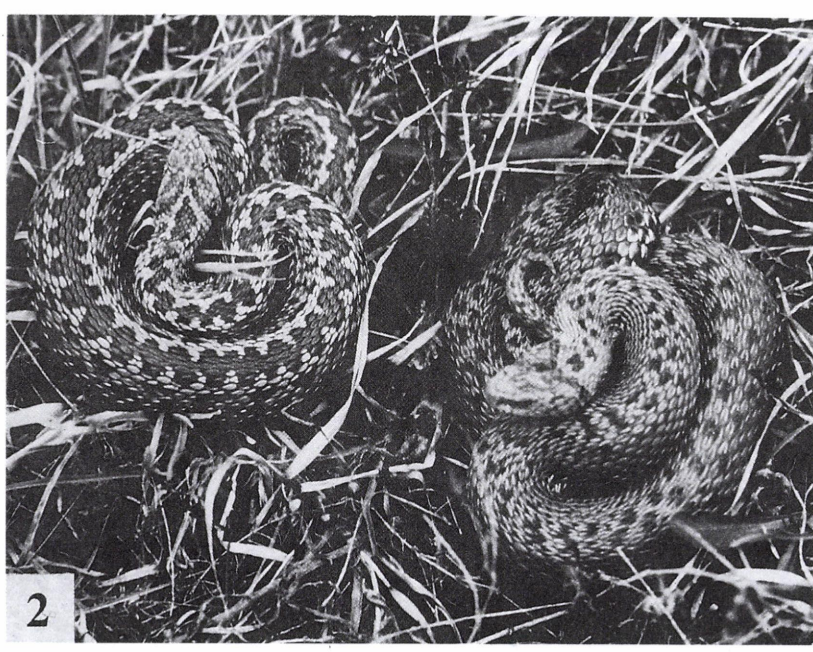

Fig. 2. The mutant female (right) and a female with normal colouration (left)

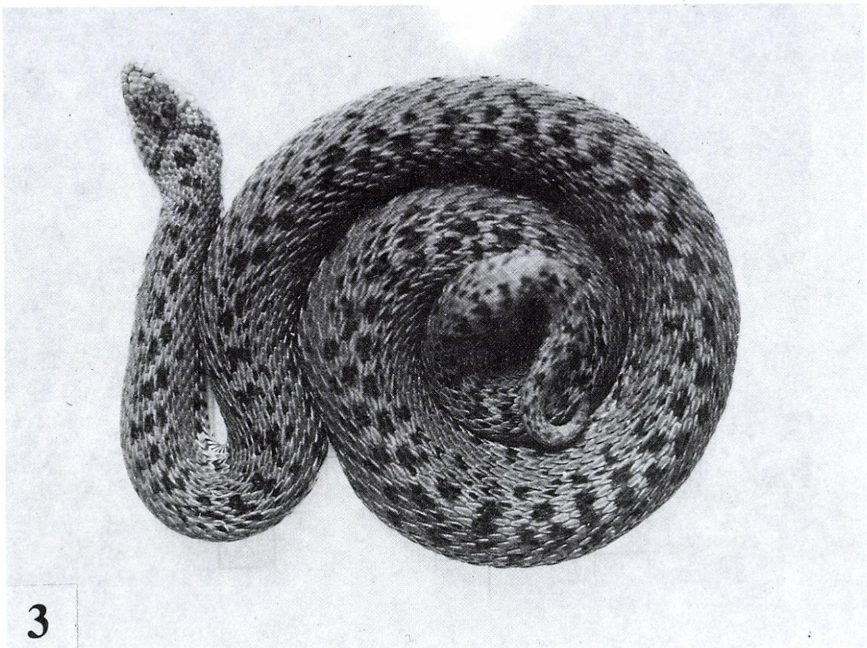

Fig. 3. The peculiar pattern of the mutant female

Fig. 4. A clutch of 19 juvenile meadow vipers: 13 specimens with mutant, 6 with normal colouration

appearance, the disordered distribution of the spots resembles to a speckled pattern.

Snout region, throat and the first ventral scales are light grey to whitish. Ventral side of the body is glittering, dark shale grey, with white hind margins similar to the scales on the side. From the alternating spots on the side only the lower series is well-developed, the upper one is usually missing, or remains only as tiny black points. In addition to the detailed description some black-and-white photographs are provided for closer observation (Figs 1-3).

Terrarium experiences

Life history of the gravid mutant female - compared to another gravid female with normal colouration - during their 95 days in terrarium is summarized in Table 1. The different events were regularly recorded on colour slide photographs. The animals were kept at the Department of Parasitology and General Zoology, University of Veterinary Science, in a glass terrarium of the size 80 x 50 cm (60 cm height) with a soil heater (temperature 24-27 °C). Five clumps of grass, two rock pieces, a small log and the drinking pot were the "furniture". During the 95 days the animals were put in the park of the University 12 times for one hour sunbathing. They sloughed three times, two of them were without any complication. Before sloughing, the specimens received a spray of warm water (28 °C). They have eaten altogether 8 mice, 2 small rats and 6 sand lizards (*Lacerta agilis*).

On the 12th of July, 1987, the mutant female has given birth to 19 youngs (Fig. 4). Thirteen of them were similar in their colour pattern to the mother, so the mutant character appeared in a ratio of 13:6! The female with normal colouration had 12 normal youngs on 14th July.

Conclusions

On the 6th of August both adults and the 31 juveniles were taken back to their original biotope. In the action, Gábor Nechay, Ministry of Environment and Tamás Pécsy, Society for Nature Conservation and Ornithology, have also participated. The juveniles were released on the meadow in a distance of 50-80 m from each other. The vegetation was high, and provided a good shade for the vipers against the Montagu's harrier (*Circus pygargus*) breeding next to the meadow.

As an explanation of this unique genetical change resulting in a peculiar colour pattern of the *Vipera ursinii rakosiensis*, perhaps the followings can be mentioned. During the last centuries the formerly continuous ancient meadows were fragmented by the human settlements and activities. The isolated populations of these small island biotopes decreased in number to such an extent, that their inbreeding became intensive, and the increasing gene mutations could produce, among others, interesting colouration changes and pattern differences, like in the case of the female described above. A similar case is mentioned by Nilson & Andrén (1986, p. 28, Fig. 6.B) for *Vipera raddei*.

Table 1. Life history of the mutant and a normally coloured female during their 95 days in terrarium

Date	mutant	normal
4. May:	defecation; 2 small mice eaten	-
5.:	defecation	-
7.:	1 small rat eaten	1 sand lizard eaten
9.:	1 ad. sand lizard eaten	2 semiad. sand liz. eaten
10.:	sun-bathing	-
12.:	2 semiad. sand liz. eaten	-
17.:	2 semiad. sand liz. eaten	2 sand lizards eaten
19.:	sun-bathing	
25.:	beginning to slough	
27.:	eyes pale greyish-blue	
28.:	warm water spray	
29.:	eyes clear, sun-bathing	
31.:	sloughing without trouble weight 116 gr, length 56 cm, slough 65 cm	sloughing with tears
31.:	small mouse eaten	*Rana arvalis* eaten (3.5 cm)
3. June:	-	1 sand lizard eaten
4.:	sun-bathing	
8.:	1 mouse, 1 sand lizard eaten	1 ad. sand lizard eaten
11.:	sun-bathing	
14.:	gravidity well observable	1 sparrow hatchling eaten
15.:	no more feeding, heavy gravidity	
28.:	beginning to slough, eyes bluish-grey	
1. July:	second sloughing	-
2.:	1 mouse eaten	sloughing with tears
6.:	sun-bathing	
7.:	sun-bathing	
12. July:	19 youngs, 13.5-14.5 cm	-
14. July:	-	12 youngs, 12.5-13.5 cm
15.:	1 small rat eaten, beginning to slough	-
18.:	sun-bathing, young eating a grasshopper	
19.:	during feeding youngs bite each other, too	
20.:	sloughing, sun-bathing	-
21.:	1 semiad. mouse eaten	sloughing, 1 mouse eaten
24.:	youngs eating grasshoppers	
27.:	sun-bathing	
30.:	sun-bathing	1 juv. mouse eaten
1. August:	-	1 juv. mouse eaten
6. August:	all specimens released	

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